

## REMARKS

Claims 1, 3-6, 8-13 and 15-18 remain in the present application.

Claims 1-19 are rejected. Claims 2, 7, 14 and 19 are cancelled herein.

Claims 1, 3, 8, 11, 12, 15 and 17 are amended herein. Applicants respectfully submit that no new matter has been added as a result of the claim amendments. Applicants respectfully request further examination and reconsideration of the rejections based on the amendments and arguments set forth below.

### Claim Rejections – 35 U.S.C. §112, First Paragraph

Claims 3 and 7-10 are rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the written description requirement. More specifically, the rejection concerns “replacing the microcontroller clock with the gatekeeper clock for clocking the virtual microcontroller when a watchdog event occurs.”

Claim 7 has been cancelled herein. As such, Applicants respectfully assert that the 35 U.S.C. §112, first paragraph, rejection of record pertaining to Claim 7 is moot.

As to Claims 3 and 8-10, Claim 3 has been amended. Applicants respectfully assert that the specification and drawings as filed adequately

support the claim language as amended. For example, as shown in Figure 8 and described in lines 17-24 on page 28, the present application discloses that “[t]he gatekeeper then reroutes the gatekeeper clock to the virtual microcontroller in place of the normal microcontroller clock (CCLOCK) using switch 616” in response to a watchdog event.

Claims 3 and 7-10 are also rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the enablement requirement. More specifically, the rejection states that the limitations “appear to be directed to physically replacing a tangible component of a tangible microcontroller with a second tangible component from a second tangible device.”

As noted above, Claim 7 has been cancelled herein, and therefore the 35 U.S.C. §112, first paragraph, rejection of record pertaining to Claim 7 is moot.

As to Claims 3 and 8-10, Applicants respectfully assert that one having ordinary skill in the arts pertaining to in-circuit emulation would be able to make and use embodiments of the present invention in light of Figure 8 and the disclosure in lines 17-24 on page 28 as discussed above. As amended, Claim 3 recites “wherein the gatekeeper circuit further comprises switching means for replacing the microcontroller clock signal with the

gatekeeper clock signal for clocking the virtual microcontroller when a watchdog event occurs.” Applicants respectfully assert that one having ordinary skill in the art would understand that one signal is being used in the place of another, and not read the limitations in question to require physical replacement of components. Moreover, Figure 8 of the instant application further dispels confusion by depicting switch 616 for rerouting the gatekeeper clock to the virtual microcontroller in place of the normal microcontroller clock (CCLOCK) using switch 616 in response to a watchdog event.

For these reasons, Applicants respectfully assert that Claims 3 and 8-10 comply with written description and enablement requirements of 35 U.S.C. §112, first paragraph.

Claim Rejections – 35 U.S.C. §112, Second Paragraph

Claims 3 and 7-10 are rejected under 35 U.S.C. §112, second paragraph, for failing to particularly point out and distinctly claim the subject matter for which applicant regards as the invention. Specifically, the rejection states that the limitation “switching means for replacing the microcontroller clock with the gatekeeper clock for clocking the virtual microcontroller when a watchdog event occurs” is vague and indefinite.

As discussed above, Claim 7 has been cancelled herein. As such, Applicants respectfully assert that the 35 U.S.C. §112, second paragraph, rejection of record pertaining to Claim 7 is moot.

As to Claims 3 and 8-10, Applicants respectfully assert that Claim 3 has been amended and satisfies the requirements of 35 U.S.C. §112, second paragraph, in light of the above discussion.

For these reasons, Applicants respectfully assert that Claims 3 and 8-10 comply with the requirements of 35 U.S.C. §112, second paragraph.

#### Claim Rejections – 35 U.S.C. §103

Claims 1-19 are rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent Number 5,911,059 to Profit, Jr. et al. (hereafter referred to as “Profit”). Applicants have reviewed the cited reference and respectfully assert that the embodiments of the present invention as recited in Claims 1, 3-6, 8-13 and 15-18 are not rendered obvious by Profit for the following reasons.

Applicants respectfully direct the Examiner to independent Claim 1, which recites an in-circuit emulation system comprising (emphasis added):

a microcontroller having a microcontroller clock;  
a virtual microcontroller running in lock-step synchronization with the microcontroller;  
a host computer running In-Circuit Emulation debug software, the host computer being in communication with the virtual microcontroller; and  
a gatekeeper circuit coupled to the virtual microcontroller and the microcontroller, the gatekeeper circuit detecting when a watchdog timer expires in the microcontroller and notifying the host computer that the watchdog event has occurred; and  
a gatekeeper clock running independent of the microcontroller clock to clock operations carried out in the gatekeeper circuit.

Claims 2, 7, 14 and 19 are cancelled herein, and therefore, Applicants respectfully submit that the 35 U.S.C. §103(a) rejections corresponding to Claims 2, 7, 14 and 19 are moot. Independent Claims 11 and 15 recite limitations similar to independent Claim 1. Claims 3-6 and 8-10 depend from independent Claim 1 and recite further limitations to the claimed invention. Claims 12-13 depend from independent Claim 11 and recite further limitations to the claimed invention. Claims 16-18 depend from independent Claim 15 and recite further limitations to the claimed invention.

Applicants respectfully assert that Profit fails to suggest, teach, or describe the limitation “a virtual microcontroller running in lock-step synchronization with the microcontroller” as recited in independent Claim 1. As disclosed in lines 1-7 on page 17, the present application discloses that the virtual microcontroller and the microcontroller “track each other’s operation continuously executing the same instructions using the same clocking signals”

so that “even if the microprocessor clock is changed during operation, they remain in lock-step.”

In contrast to the claimed embodiments, Applicants understand Profit to teach that a target program and target circuitry must be resynchronized periodically (col. 7, lines 49-54). As such, the target circuitry and target program as taught by Profit do not continuously execute the same instructions using the same clocking signals, which are necessary to remain in lock-step synchronization as disclosed in the present application. Therefore, Profit fails to suggest, teach, or describe a virtual microcontroller running in lock-step synchronization with the microcontroller as claimed. Moreover, by teaching that the target program and target circuitry do not operate in lock-step synchronization as claimed, Profit effectively teaches away from the claimed embodiments.

Applicants respectfully assert that Profit fails to suggest, teach, or describe the limitation “a gatekeeper clock running independent of the microcontroller clock” as recited in independent Claim 1. As disclosed in lines 26-29 on page 26, the present application discloses that “in order to assure that gatekeeper 602 operates independently of virtual microcontroller 220 and standard microcontroller under test 232, gatekeeper 602 operates with

an independent gatekeeper clock 610 that runs without regard for the functionality of any other clock in the system.”

In contrast to the claimed embodiments, assuming arguendo that the RUN/HALT controller 240 as taught by Profit is analogous to the gatekeeper as claimed and that processor 204 taught by Profit is analogous to the microprocessor as claimed, Profit teaches that the RUN/HALT controller 240 and the processor 204 are both driven by clock 242 (col. 9, lines 29-31). As such, given that the processor and RUN/HALT controller taught by Profit are driven by the same clock, Profit fails to suggest, teach or describe a gatekeeper clock running independent of the microcontroller clock as claimed. Moreover, by teaching that the RUN/HALT controller and processor do not run independently as claimed, Profit effectively teaches away from the claimed embodiments.

For these reasons, Applicants respectfully assert that independent Claim 1 is neither anticipated nor rendered obvious by Profit, thereby overcoming the 35 U.S.C. §103(a) rejections of record. Since independent Claims 11 and 15 contain limitations similar to those discussed above with respect to independent Claim 1, independent Claims 11 and 15 also overcome the 35 U.S.C. §103(a) rejections of record. Since Claims 3-6 and 8-10 depend from independent Claim 1 and recite further limitations to the claimed

invention, and Claims 12-13 depend from independent Claim 11 and recite further limitations to the claimed invention, and Claims 16-18 depend from independent Claim 15 and recite further limitations to the claimed invention, dependent Claims 3-6, 8-10, 12-13 and 16-18 also overcome the 35 U.S.C. §103(a) rejections of record as they depend from allowable base claims. Thus, Claims 1, 3-6, 8-13 and 15-18 are therefore allowable.



CONCLUSION

Applicants respectfully assert that Claims 1, 3-6, 8-13 and 15-18 are in condition for allowance and Applicants earnestly solicit such action from the Examiner.

The Examiner is urged to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Please charge any additional fees or apply any credits to our PTO deposit account number: 23-0085.

Respectfully submitted,

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